

ABSTRACT OF THE DISCLOSURE

5 A sensor front end for an electronic radar sensor is disclosed that provides for a lower parts count while providing technical functionality by using multifunction parts, i.e., parts that are used both in transmitting and receiving. The sensor front end includes a continuous wave signal source that functions as a signal source when the front end is transmitting a signal and as a local oscillator when the front end is receiving a signal. The sensor front end also includes a tri-mode mixer that functions as a phase-modulator and transmit switch when the front end is transmitting a signal and as a mixer/down-converter when the front end is receiving a signal. The sensor front end further includes a common aperture antenna that acts as both a transmitting antenna for transmitting a sensor signal and for receiving a reflected signal from a object. A phase shifter can be added to provide a predetermined phase shift in the transmitted sensor signal, the received reflected signal, or both, such that in-phase and quadrature signal components are provided. In addition, phase coding may be added to the signal to reduce the degenerative impact of interfering signals. A receiver module is coupled to the tri-mode mixer such that, when receiving a reflected signal, the receiver provides a baseband sensor output signal that can be used to determined the position and velocity of the object. A sampling module can be added such that the sensor output signal is sampled and provided as an analog signal, or the sampled sensor output signal can be provided to an analog-to-digital converter to convert the sensor output signal into a digital format, or both.

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